# CST-201-O500: Algorithms and Data Structures

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# Tower of Hanoi Moves Analysis Report

## 1. Introduction

This report provides a walkthrough of the Tower of Hanoi disk movement assignment for CST-201. The goal is to implement a non-recursive algorithm in Java to compute the number of moves made by the ith disk in the optimal Tower of Hanoi solution. The program reads user input for the total number of disks (n) and the disk position (i), and calculates the result using the formula 2^(n - i).

## 2. Pseudocode

The pseudocode for the disk move calculation is included in the project ZIP at the following file path**: TowerHanoiMovesProject/pseudocode.txt**  
Please refer to that file for the full pseudocode steps.

## 3. Source Code (Java)

The Java source code is located in the following file path within the project ZIP structure:  
  
**TowerHanoiMovesProject/src/TowerHanoiMoves.java**  
  
Please refer to that file for the full implementation.

## 4. Program Execution and Output

The following screenshot will be inserted to show the actual program execution with two test cases:  
  
- Test Case 1: n = 64, i = 1 → Expected: 9223372036854775808  
- Test Case 2: n = 5, i = 5 → Expected: 1  
  
Screenshot:

A screen shot of a computer program

AI-generated content may be incorrect.

## 5. Video Demonstration

A short video (little be more than 3 minutes) has been recorded using Loom to demonstrate the program and discuss the logic and real-world implications of algorithmic decision-making.

Loom Video Link: <https://www.loom.com/share/3ae0756b1ae347a884ebdcd8d5ffa5f2>

## 6. Conclusion

This assignment demonstrates the use of efficient, non-recursive algorithms in Java. The program uses input validation, bit-shifting or BigInteger for power calculations, and provides accurate output for large values. The assignment also includes a discussion on the consequences and assumptions behind algorithm design in broader technological contexts.

The Java source code is also available on my public GitHub:

<https://github.com/bebakouma/TowerHanoiMoves>